

ABSTRACT OF THE DISCLOSURE

An ONO-type inter-poly insulator is formed by depositing intrinsic silicon on an oxidation stop layer. In one embodiment, the oxidation stop layer is a nitridated top surface of a lower, and conductively-doped, polysilicon layer. In one embodiment, atomic layer deposition (ALD) is used to precisely control the thickness of the deposited, intrinsic silicon. Heat and an oxidizing atmosphere are used to convert the deposited, intrinsic silicon into thermally-grown, silicon dioxide. The oxidation stop layer impedes deeper oxidation. A silicon nitride layer and an additional silicon oxide layer are further deposited to complete the ONO structure before an upper, and conductively-doped, polysilicon layer is formed. In one embodiment, the lower and upper polysilicon layers are patterned to respectively define a floating gate (FG) and a control gate (CG) of an electrically re-programmable memory cell. In an alternative embodiment, after the middle, silicon nitride of the ONO structure is defined, another layer of intrinsic silicon is deposited, by way of for example, ALD. Heat and an oxidizing atmosphere are used to convert the second deposited, intrinsic silicon into thermally-grown, silicon dioxide. An ONO structure with two thermally-grown, and spaced apart, silicon oxide layers is thereby provided.

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